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TABLE 2

CORRELATIONS IN THE MALE ADULT SERIES

CORRELATED MEASUREMENTS	COEFFICIENTS OF CORRELATION	
	540 Full-bloods	77 Half-bloods
Stature and Sitting Height	0.61	0.65
Stature and Width of Shoulder	0.35	0.48
Stature and Arm Reach	0.81	0.85
Stature and Length of Arm	0.70	0.76
Length and Width of Head	0.27	0.54
Width of Head and Width of Face	0.55	0.51
Anatomical Height and Width of Face	0.16	0.08
Height and Width of Nose	0.05	0.02

TRANSMISSION OF EYE-DEFECTS INDUCED IN RABBITS BY MEANS OF LENS-SENSITIZED FOWL-SERUM

BY M. F. GUYER AND E. A. SMITH

ZOÖLOGICAL LABORATORY, UNIVERSITY OF WISCONSIN

Communicated by L. Hektoen, January 19, 1920

As the work progresses it is becoming increasingly evident that the discoveries made in the field of serology all have their broader biological aspects, and that they afford new methods of attacking certain fundamental biological problems. Not the least of these is a possible method of breaching the wall which has gradually come to surround the long-standing problem of provoking specific modifications in the germ-cell through the direct action of external agencies, or indirectly, through changes produced in the parental body. For if external influences *can* be transmitted to the germ-cell, the one obvious means of conveyance in higher animals is the blood, and when one considers the protean possibilities which modern work has revealed in the blood, it is certainly a rational quest to seek in this medium a possible means of altering the germ. To set the problem more specifically, if a serum of one species of animal can be so sensitized to a given tissue or tissues of another species that it will become toxic or lytic for the tissue in question, may it not be that there is sufficient constitutional identity between the mature substance of the tissue and at least some of its material antecedents in the germ, that the latter may also be influenced specifically by the sensitized serum? Or may not changes in its own tissues originate antibodies in the blood serum of a given individual which will not only react with the tissue elements themselves but with their correlatives in the germ cells?

In an attempt to find answers to these and kindred questions we have been engaged in series of experiments which have extended over a period of four years and which are still in progress. To state briefly some of our results, we have been able occasionally to produce what appear to be specific antenatal lens-defects in rabbits and mice by means of fowl-serum sensitized to rabbit-lens and mouse-lens respectively. And, what is probably of more interest, breeding experiments with the affected rabbits show that the defect, once established, may be transmitted to subsequent generations.

Since most of the work was done with rabbits the following account is concerned with them alone. Chickens were employed as the source of the antibodies. To produce these, the fresh lenses of rabbits were pulped thoroughly in a mortar and diluted with normal salt solution. By means of a hypodermic syringe about four cubic centimeters of the emulsion was injected into the peritoneal cavity of the fowl. In later experiments some of the fowls were injected intravenously as well as intraperitoneally. Ordinarily the fowls were treated with such lens-emulsions at intervals of a week for four or five weeks and were then allowed to rest a week of ten days before bleeding.

In the mean time rabbits had been bred so as to have the young advanced to about the tenth day of pregnancy. From four to seven cubic centimeters of the sensitized fowl-serum (sometimes diluted with normal saline) were injected into the pregnant rabbits at intervals of two or three days from about the tenth to the twentieth days of pregnancy. Some rabbits died from the treatment, many young were killed in utero, but a goodly number also survived. Among the latter were occasional individuals with opaque (sometimes liquid) lenses and eyes otherwise defective (reduced size, cleft iris, persistent hyaloid artery, bluish or silvery color instead of the characteristic red of the albino eye, and occasionally almost complete disappearance of the eyeball). Taking into account the method of embryological development of the eye, however, these defects are probably all attributable to the early injury of the lens.

Out of sixty-one surviving young from mothers treated during pregnancy with lens-sensitized serum, four had one or both eyes conspicuously defective and five others had eyes which, though less noticeably modified, were nevertheless abnormal. Others also may have had their eyes affected, but if so, the condition was not observable from the exterior. As a matter of fact, liquid lenses were found in a few young ones which were dissected in the earliest experiments. This condition was not detectable in the living animal. Of the controls, from mothers treated with pure (i. e., unsensitized) fowl-serum twelve living young were obtained, and from others treated with serum sensitized to rabbit-tissue other than lens, thirty-six young were secured, or a total of forty-eight which survived long enough to show the condition of their eyes. In not one of these forty-eight controls was there evidence of eye-defect. The experiments indicate, therefore, that the effect of the lens-sensitized serum is specific.

As already mentioned, once the defect is secured, it may be transmitted to subsequent generations through breeding. So far we have succeeded in passing it to the sixth generation. There seems to be no reason why it will not go on indefinitely since the imperfection tends to become worse in succeeding generations and also to occur in a proportionally greater number of young. The transmission was not infrequently of an irregular unilateral type, sometimes only the right, at others only the left eye showing the defect. In later generations there was an increasing number of young which had both eyes affected.

To meet the objection that we were not getting instances of true inheritance in each generation but merely placental transmissions of antibodies or kindred substances from the blood stream of the mother, it was obviously necessary to establish the descent through the male line alone. To do this females from strains of rabbits unrelated to our defective-eyed stock were mated to defective-eyed males. The first generation produced in this way were invariably normal-eyed, but when females of this generation in turn were mated to defective-eyed males the defect reappeared in some of the progeny somewhat after the manner of an extracted Mendelian recessive. Inasmuch as the defect can thus be made to reappear in the descendants of a male with abnormal eyes when he is mated to a female from unrelated and untreated stock, it is obvious that it could only have been conveyed through the germ-cells of the male, and that it may, therefore, be pronounced an example of true inheritance.

The detailed study, with charts, pedigrees, drawings and photographs will appear shortly in the *Journal of Experimental Zoölogy.*

ON THE MECHANISM OF FEVER REDUCTION BY DRUGS

BY HENRY G. BARBOUR AND JULIAN B. HERRMANN

DEPARTMENT OF PHARMACOLOGY, YALE UNIVERSITY, SCHOOL OF MEDICINE

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Correlation of antipyretic drug action with the carbohydrate metabolism has been suggested by one of us[1] as a result of two findings in fever patients. In the first place dextrose by mouth has been found frequently to exert a mild antipyretic action; on the other hand, acetyl-salicylic acid or antipyrine under similar conditions increase the respiratory quotient, thus indicating a relatively augmented carbohydrate combustion. These facts point strongly to a mobilization of sugar by such drugs.

We have, therefore, investigated the effects of antipyretics upon normal and fevered dogs with particular attention to the concentration of dextrose in the blood. Mild fever was produced by the subcutaneous injection upon the preceding day of a suspension of killed colon bacilli. Doses of from 0.2 to 0.5 gram. per kilo of the following drugs were given: sodium salicylate, quinine hydrochloride, antipyrine (all subcutaneously)